

November 19, 2021

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street N.E.
Washington, DC 20426

Via Electronic Filing

Re: Lewis Ridge Pumped Storage Project, Application for Preliminary Permit.

Dear Secretary Bose:

Pursuant to 18 CFR §§ 4.32 and 4.81, on behalf of Lewis Ridge Pumped Storage, LLC (the Applicant) is submitting to the Federal Energy Regulatory Commission (FERC) an Application for Preliminary Permit for the Lewis Ridge Pumped Storage Project (Project).

The Project site is located near the Cumberland River in Blackmont, Tejay, Balkan, and Callaway, Kentucky. The Project will involve the construction of new water storage, water conveyance, and generation facilities, as well as primary transmission lines. The Applicant is submitting this application to secure and maintain priority of the application for license while undertaking activities to assess the feasibility of the Lewis Ridge Pumped Storage Project and to support an Application for License.

If there are any questions or comments regarding the Application for Preliminary Permit, please contact me at (503) 309-2496, via email at nathan@ryedevelopment.com, or at the address below.

Sincerely,



Mr. Nate Sandvig
Vice President
Lewis Ridge Pumped Storage, LLC
220 NW 8th Ave
Portland, OR 97209

Attachment: Application for Preliminary Permit for the Lewis Ridge Pumped Storage Project

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

**APPLICATION FOR PRELIMINARY PERMIT
FOR THE
LEWIS RIDGE PUMPED STORAGE PROJECT
FERC PROJECT NO. ____-____**

Prepared by:

**LEWIS RIDGE PUMPED STORAGE, LLC
One Beacon Street, 15th Floor
Boston, MA 02108**

November 22, 2021

TABLE OF CONTENTS

Initial Statement	1
Information Required by 18 C.F.R. § 4.32	3
Verification Statement	5
1 EXHIBIT 1 – DESCRIPTION OF THE PROPOSED PROJECT (18 CFR §4.81(b))	6
1.1 General Project Configuration.....	6
1.2 Reservoirs	8
1.2.1 Upper Reservoir.....	8
1.2.2 Lower Reservoir	8
1.3 Transmission Lines.....	8
1.4 Estimate of Annual Energy Production.....	8
1.5 Lands of the United States.....	9
1.6 Public Interest.....	9
2 EXHIBIT 2 – DESCRIPTION OF PROPOSED STUDIES (18 CFR § 4.81(c))	10
2.1 Description of Studies	10
2.1.1 Description of Proposed Studies.....	10
2.1.2 Need for New Roads.....	10
2.2 Work Plan for New Dam Construction	11
2.2.1 Description of Field Studies	11
2.2.2 Proposed Schedule.....	11
2.3 Waiver	11
2.4 Statement of Cost and Financing.....	11
2.4.1 Estimated Costs	11
2.4.2 Project Financing.....	11
3 EXHIBIT 3 – PROJECT MAPS (18 CFR § 4.81(d))	12
3.1 General Location of Proposed Project.....	12
3.2 Project Features	12
3.3 Proposed Project Boundary	12
3.4 National Wild and Scenic River Systems.....	12
3.5 Designated Wilderness Areas.....	12

LIST OF FIGURES

Figure 3.1-1: Proposed Project Location Map	13
Figure 3.2-1: Proposed Project Features Map.....	14
Figure 3.3-1: Proposed Project Boundary Map	15

LIST OF ABBREVIATIONS

Applicant	Lewis Ridge Pumped Storage, LLC
feet	ft
cubic feet per second	cfs
FERC or Commission	Federal Energy Regulatory Commission
FPA	Federal Power Act
GWh	Gigawatt-hour
msl	Mean sea level
MW	Megawatts
Project	Lewis Ridge Pumped Storage Project

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION
Application for Preliminary Permit
for the
Lewis Ridge Pumped Storage Project
May 2021

INITIAL STATEMENT

(1) Lewis Ridge Pumped Storage, LLC, a limited liability company (the Applicant) hereby applies to the Federal Energy Regulatory Commission (FERC or the Commission) for a preliminary permit for the proposed Lewis Ridge Pumped Storage Project (Project), as described in the attached exhibits. This application is made so that the Applicant may secure and maintain priority of application for a license for the Project under Part I of the Federal Power Act (FPA) while obtaining the data and performing the acts required to determine the feasibility of the Project and to support an application for a license.

(2) The location of the Project is:

State or Territory:	Kentucky
County:	Bell
Township or nearby town:	Blackmont, Tejay, Balkan and Callaway
Stream or body of water:	Cumberland River

(3) The exact name and address of the Applicant is:

Lewis Ridge Pumped Storage, LLC
One Beacon Street, 15th Floor
Boston, MA 02108

(4) The exact name and business address of each person authorized to act as agent for the Applicant in this application is:

Mr. Nate Sandvig
Vice President
Lewis Ridge Pumped Storage, LLC
220 NW 8th Ave
Portland, OR 97209
(503) 309-2496
nathan@ryeddevelopment.com

(5) Lewis Ridge Pumped Storage, LLC is a limited liability company organized and existing pursuant to the laws of the State of Kentucky, and as such the Applicant is qualified under Section 4(e) of the FPA to apply for and hold hydroelectric licenses issued under Part I of the FPA. The Applicant is not claiming preference under Section 7(a) of the FPA.

(6) The proposed term of the requested permit is 48 months.

(7) There is no existing dam associated with the Project.

INFORMATION REQUIRED BY 18 C.F.R. § 4.32

- 1. Identify every person, citizen, association of citizens, domestic corporation, municipality, or state that has or intends to obtain and will maintain any proprietary right necessary to construct, operate or maintain the project:**

The Applicant, Lewis Ridge Pumped Storage, LLC, intends to obtain and will maintain any proprietary rights necessary to construct, operate, and maintain the licensed Project.

- 2. Identify (providing names and mailing addresses):**

- (i) Every county in which any part of the project and any Federal facilities that would be used by the project would be located;**

County Clerk
Bell County
101 Courthouse Sq.
P.O. Box 157
Pineville, Kentucky 40977

- (ii) Every city, town, or similar local political subdivision:**

- i. In which any part of the Project, and any Federal facility that would be used by the project, would be located; or**

The proposed Project is located within the unincorporated communities of Blackmont, Tejay, Balkan, and Callaway, Kentucky, which fall under the jurisdiction of the Bell County.

- ii. That has a population of 5,000 or more people and is located within 15 miles of the project dam.**

City Hall
221 N. 21st Street
Middlesboro, Kentucky 40965

- (iii) The names and mailing addresses of every irrigation district, drainage district, or similar special purpose political subdivision (A) in which any part of the project is located, and any Federal facility that is or is proposed to be used by the project is located, or (B) that owns, operates, maintains, or uses any project facility or any Federal facility that is or is proposed to be used by the project:**

There is no irrigation district, drainage district, or similar special purpose political subdivision in which any part of the Project is located or that owns, operates, maintains, or uses any Project facility.

The Project uses no Federal facilities and occupies no Federal lands.

(iv) The names and mailing addresses of every other political subdivision in the general area of the project that there is reason to believe would likely to be interested in, or affected by the notification are:

There is no other political subdivision in the general area of the Project that there is reason to believe would be likely to be interested in, or affected by, this notification.

(v) The names and mailing addresses of potentially affected Indian tribes

Southern Cherokee Nation of Kentucky P.O. Box 1750 Henderson, KY 42419	Delaware Nation P.O. Box 825 Anadarko, OK 73005
Eastern Band of Cherokee Indians P.O. Box 455 Qualla Boundary Cherokee, NC 28719	Miami Tribe of Oklahoma P.O. Box 1326 Miami, OK 74355-1326
Peoria Tribe of Indians of Oklahoma P.O. Box 1527 Miami, OK 74355-1527	

VERIFICATION STATEMENT

This application for preliminary permit is executed in the

STATE OF: OREGON

COUNTY OF: MULTNOMAH

By: Mr. Nate Sandvig, being duly sworn, deposes and says that the contents of this application for preliminary permit are true to the best of his knowledge and belief. The undersigned applicant has signed this application for preliminary permit this ____ day of May 2021.

Nate Sandvig

Mr. Nate Sandvig
Vice-President
Lewis Ridge Pumped Storage, LLC
220 NW 8th Ave
Portland, OR 97209
Telephone: (503) 309-2496

Subscribed and sworn to before me, a Notary Public of the State of OREGON, this 19 day of ~~May~~ 2021.

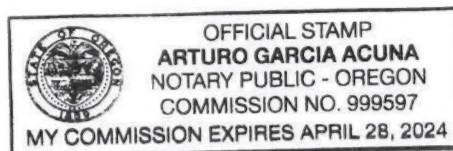
NOVEMBER

(AA)

[Signature]

Notary Public

Seal:



1 EXHIBIT 1 – DESCRIPTION OF THE PROPOSED PROJECT (18 CFR §4.81(b))

1.1 General Project Configuration

The proposed Project is located within the communities of Blackmont, Tejay, Balkan and Callaway, Kentucky adjacent to the Cumberland River in Bell County, Kentucky ([Figure 3.1-1](#)).

The Project is proposed as a pumped storage hydroelectric generating facility, which will involve the construction of new water storage, water conveyance, and generation facilities at off-channel locations where no such facilities exist at this time. The proposed Project concept is based on traditional pumped storage technologies of “storing” electric energy in the form of hydraulic potential, by pumping water to an upper reservoir during off-peak times and allowing it to flow back through hydroelectric turbines when electric demand is peaking. The proposed Project is a closed loop pumped storage project that seeks to derive the benefits of traditional pumped storage, essentially increasing off-peak load and increasing generating capacity during peak demand periods, but in an improved manner that reduces and avoids many of the environmental impacts of the traditional pumped storage facility design.

The existing Project site features topography beneficial to a closed loop system. A valley adjacent to the Cumberland River with a small pond(s) present is proposed to be utilized as the lower reservoir. Water will be circulated between a lower and upper reservoir to store/generate power. The adjacent Cumberland River is proposed to be used to initially fill the lower reservoir and as a source of make-up water to periodically replace water lost to evaporation and infiltration.

Dams and Embankments:

A zoned rockfill embankment dam 100 feet (ft) high and 1,400 ft long will be constructed on the western side of the proposed lower reservoir, along with a 10-foot-high and 5,900-foot-long zoned rockfill embankment around the perimeter of the lower reservoir to enclose the existing topography up to elevation 1,290 ft mean sea level (msl), providing a reservoir with a surface area of approximately 23 acres. The embankment dams and ring dike will have impermeable clay cores and an impermeable concrete liner on water side slopes.

Lower Reservoir Configuration	
Structure Type	Zoned rockfill embankment ring dike
Height	10 ft
Length	5,900 ft
Structure Type	Zoned rockfill dam
Height	100 ft
Length	1,400 ft

To the east approximately, 4,000 feet from the proposed lower reservoir, is a raised plateau largely clear of vegetation approximately 3,000 feet long and 500 feet wide. A zoned rockfill embankment dike approximately 77 ft high and 5,700 ft long is proposed to be constructed to enclose the perimeter of the 30-acre upper reservoir. The embankment ring dike will have an impermeable clay core and an impermeable concrete liner on water side slope.

Upper Reservoir Configuration	
Structure Type	Zoned rockfill embankment ring dike
Height	77 ft
Length	5,700 ft

Intake /Water Conveyance Structures:

During generation, the proposed system will draw water from the upper reservoir through a steel reinforced concrete intake structure, using the force of gravity, down a 987 foot-long, 20-foot diameter vertical power tunnel/shaft connecting to a 4,000-foot-long horizontal power tunnel to the powerhouse. The horizontal power tunnel will have a horse-shoe configuration with an approximate area of 315 square-feet. Flow will then be conveyed through a steel manifold, to four reversible pump-turbine units, before discharging into the lower reservoir. To prevent debris from being entrained, steel trashracks with 3.75-inch bar spacing will be installed to span the intakes in both the upper and lower reservoirs.

Water Conveyance Structure Configuration	
Total Length Horizontal Power Tunnel	4,000 ft
Total Length Vertical Power Tunnel	987 ft
Power Tunnel Diameter	20 ft
Intake Structure Composition	Steel/concrete

Surge Control Facilities:

It is anticipated an approximately 120-foot high, 30 foot-diameter steel surge tower will be required to release pressure during a turbine trip and will be located just upstream of the powerhouse connected directly to the horse-shoe power tunnel.

Powerhouse:

The proposed 80-foot wide by 420-foot-long reinforced-concrete powerhouse will be located on the eastern edge of the lower reservoir with an integral intake and four Francis pump-turbine units. The proposed powerhouse will contain four 54 MW pump-turbine units with a combined capacity of 216 MW under a design head of approximately 980 ft. As a pumped storage project, the facility will be configured to generate 216 MW in cycling or peaking mode for approximately eight hours a day, with 16 hours of the remainder of the daily cycle used to pump the water from the lower reservoir back up to the upper reservoir, using the reversible turbines as pumps running on off-peak power.

During pumping operations, water will be drawn through the four reversible Francis pump-turbine units into four 10-foot-diameter steel pipes that will merge into a 20 foot-diameter penstock, which will convey water to the upper reservoir. During generation, operations will be reversed.

Powerhouse Configuration	
Pump-Turbine Type	Reversible Francis
Number of Units	4
Rated Discharge (per unit)	870 cfs
Total Rated Project Discharge	3,480 cfs
Installed Generation Capacity (per unit)	54 MW
Total Installed Generation Capacity	216 MW
Hydraulic Head	980 ft

Refill Conduit/Pumping Station:

While the proposed system is closed loop, the Cumberland River will be used to periodically replenish water lost to evaporation and infiltration, as well as the initial filling of the lower reservoir. A concrete

pump station with a capacity of 100 cfs is proposed along the eastern bank of the Cumberland River, which will be used to convey water through a 1,700 foot-long, 3.5-foot diameter steel conduit to the lower reservoir.

Refill Conduit/Pumping Station Configuration	
Pumping Station Capacity	100 cfs
Refill Conduit Length	1,700 ft
Refill Conduit Diameter	3.5 ft

1.2 Reservoirs

1.2.1 Upper Reservoir

The Project will include a proposed upper reservoir constructed on an existing plateau with a normal maximum water surface elevation of approximately 2,277 ft msl. The upper reservoir would cover approximately 30 acres and the perimeter would be contained by a zoned rockfill embankment approximately 77 feet high. The approximate storage volume of the upper reservoir will be 2,300 acre-ft. The upper reservoir will receive water pumped from the proposed lower reservoir during normal Project operation.

Upper Reservoir	
Surface Area at Maximum Pool	30 acres
Active Storage Capacity	2,300 acre-ft
Maximum Water Surface Elevation	2,277 ft, msl

1.2.2 Lower Reservoir

The proposed lower reservoir would be constructed in an existing valley and include an approximately 100-foot-high zoned rockfill dam on its western end. The lower reservoir would cover approximately 23 acres and the remaining perimeter of the lower reservoir would be contained by a 10-foot-high zoned rockfill ring dike. The lower reservoir would have a normal maximum water surface elevation of approximately 1,290 ft msl, and a storage capacity of approximately 2,300 acre-ft.

Lower Reservoir	
Surface Area at Maximum Pool	23 acres
Active Storage Capacity	2,300 acre-ft
Maximum Water Surface Elevation	1,290 ft, msl

1.3 Transmission Lines

The proposed Project would include a new 1.3-mile long 161 kV overhead transmission line that will extend from a proposed substation near the proposed powerhouse to an interconnection point with an existing substation in the town of Callaway, Kentucky. The transmission route will cross the Cumberland River and follow an approximately 100-foot-wide corridor. The proposed substation will include two 90 MVA Generator Step-up Units (GSUs), relays and controls, breakers, and switches as required by the existing substation owner/electric service provider.

1.4 Estimate of Annual Energy Production

The powerhouse will be equipped with four reversible Francis pump-turbines with a total installed capacity of 216 MW under a design head of 980 ft. The estimated average annual energy production is 605 GWh. This value is based on an assumed operation in cycling or peaking mode for approximately eight hours a day, with 16 hours of the remainder of the daily cycle used to pump the water. The turbine/generating units will be newly manufactured for the Project.

1.5 Lands of the United States

There are no lands of the United States included within the proposed Project boundary. In accordance with the regulations for Exhibit 1 of a preliminary permit application (18 CFR §4.81(b)(5), FERC Form 587 must be included in the application for Projects with boundaries that include lands of the United States. FERC Form 587 is not included in this application as the project boundary does not include any Federal facilities or Federal lands.

1.6 Public Interest

The proposed Project will fulfill the public interest in the following manner.

- Provide a reliable source of green, renewable power.
- Add much needed peaking capacity.
- Offer sustainable development with direct investment into the local and regional economy.
- Improve black start capability of the regional power grid.
- Increase transmission system performance and reliability.
- Improve thermal plant efficiency by reduced operation in inefficient rapid response mode.
- Reduce thermal generation reserve requirement.
- Reduce volatility of electricity prices, adding balance to load disparities in the market.
- Provide a method to store intermittently generated energy, such as wind and solar energy.

2 EXHIBIT 2 – DESCRIPTION OF PROPOSED STUDIES (18 CFR § 4.81(c))

2.1 Description of Studies

Upon issuance of a Preliminary Permit, the Applicant proposes to conduct detailed studies to determine the ultimate feasibility of the Project and potentially support the preparation of an Application for License, as described below.

2.1.1 Description of Proposed Studies

The Applicant has performed preliminary review of proposed Project as part of a prefeasibility study. The Applicant proposes to conduct a more detailed feasibility study of the technical features of the Project. The feasibility study will be designed to evaluate various Project concepts, layouts, and equipment arrangements to optimize the Project configuration, while considering potential environmental impacts. The study will be in sufficient depth and breadth to provide information needed for preparation of an Application for License for the pumped storage project, as well as construct the Project. The feasibility study is expected to include, but not be limited to, the following.

1. Evaluations of alternative Project configurations, and selection of preferred alternative.
2. Topographic land surveys and bathymetric surveys.
3. Geotechnical investigations.
4. Ecological resources investigations, including but not limited to:
 - water quality investigations,
 - fisheries surveys,
 - endangered and threatened species investigations,
 - wildlife and botanical surveys,
 - wetland surveys,
 - recreation assessments,
 - aesthetic resource surveys,
 - socio-economic assessments, and
 - cultural resources surveys.
5. Engineering studies to optimize Project configuration, while avoiding and minimizing potential Project impacts.
6. Power marketing assessments and preliminary power sales analyses.
7. Transmission interconnection planning.
8. Cost estimating, economic feasibility, and financial planning investigations.

If the result of the feasibility analysis is favorable, the following activities are envisioned to take place during the remaining preliminary permit term to support the FERC licensing and development of the Project.

9. Develop Notice of Intent and Pre-Application Document.
10. Stakeholder consultation and discussion.
11. Additional study plan preparation and scoping, as needed.
12. Develop Application for License.

2.1.2 Need for New Roads

There are no access roads needed to complete the studies described above. All areas within the proposed Project boundary are accessible from existing roadways.

2.2 Work Plan for New Dam Construction

2.2.1 Description of Field Studies

The upper and lower reservoir locations will be investigated by borehole drilling, test pits, sampling and in-situ and laboratory testing. Measures will be taken to avoid or minimize disturbance at the drill sites. There will be no investigations in wetland areas or navigable streams. The locations and timing of such investigations have yet to be determined; however, the drilling will be conducted within the identified Project footprint.

2.2.2 Proposed Schedule

A proposed schedule showing the approximate intervals at which studies, investigations, tests, or surveys are anticipated to be completed during the permit term is provided below and is subject to change as determined by field conditions and/or additional information.

Task	From beginning of Month	To end of Month
Evaluations of alternative Project configurations, and selection of preferred alternative	0	12
Topographic land surveys and bathymetric surveys.	6	18
Geotechnical investigations	6	18
Ecological resources investigations	12	36
Engineering studies to optimize Project configuration	12	24
Power marketing assessments and preliminary power sales analyses	24	36
Transmission interconnection planning	12	24
Cost estimating, economic feasibility, and financial planning investigations	12	36
Preparation, consultation, and filing of Application for License	12	48

2.3 Waiver

It is anticipated that preliminary field studies, tests, and other activities to be conducted under the permit would not adversely affect cultural resources or endangered species and would cause only minor alterations or disturbances of lands and waters, and that any land altered or disturbed would be adequately restored. This is particularly true since the lower and upper reservoirs necessary for construction of this Project are primarily located on areas that were formerly strip mined for coal. The Applicant therefore requests waiver of the full requirement of 18 CFR § 4.81(c)(2)

2.4 Statement of Cost and Financing

2.4.1 Estimated Costs

The total cost for completing items 1 through 8 in [Section 2.1-1](#) is estimated to range from \$800,000 to 1,000,000. If items 9 through 12 in [Section 2.1-1](#) are undertaken the total cost is estimated to range from \$200,000 to \$400,000.

2.4.2 Project Financing

The expected source of financing to conduct the activities identified in [Section 2.1-1](#) is the Applicant. The source of funding for these activities is from private funds available to the Applicant.

3 EXHIBIT 3 – PROJECT MAPS (18 CFR § 4.81(d))

This section contains maps showing the location, the Project layout, and the Project boundary for the proposed Project.

3.1 General Location of Proposed Project

The proposed Project location is shown on [Figure 3.1-1](#).

3.2 Project Features

The probable locations of the primary Project features are shown in [Figure 3.2-1](#).

3.3 Proposed Project Boundary

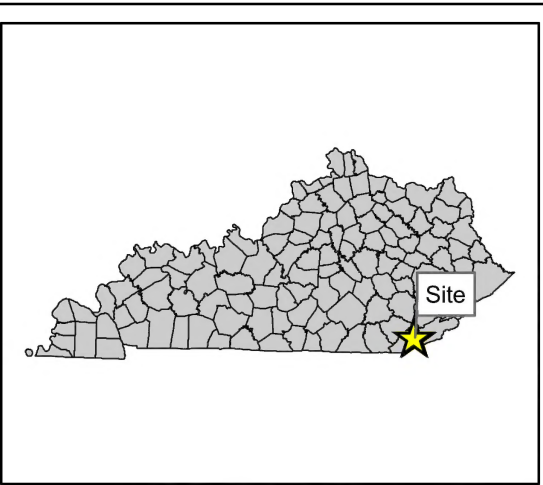
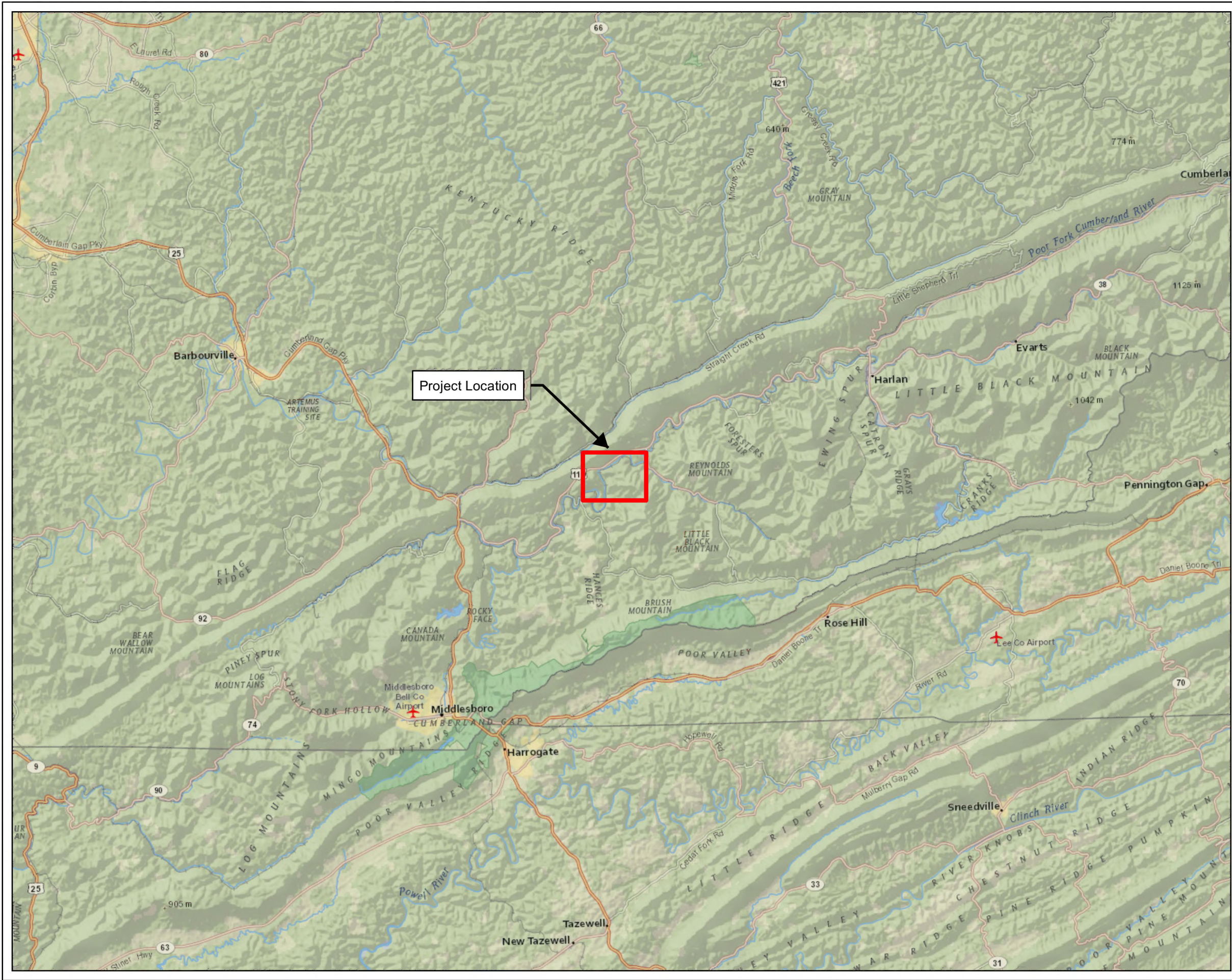
The proposed Project boundary is shown on [Figure 3.3-1](#).

3.4 National Wild and Scenic River Systems

The proposed Project area does not include any areas designated as or being considered for inclusion in the National Wild and Scenic Rivers System.

3.5 Designated Wilderness Areas

The proposed Project area does not include any areas designated as or recommended for designation as a wilderness area or wilderness study area under the Wilderness Act.



Rye Development

Figure 3.1-1:
Proposed Project Location Map

Lewis Ridge Pumped Storage Project

Service Layer Credits: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

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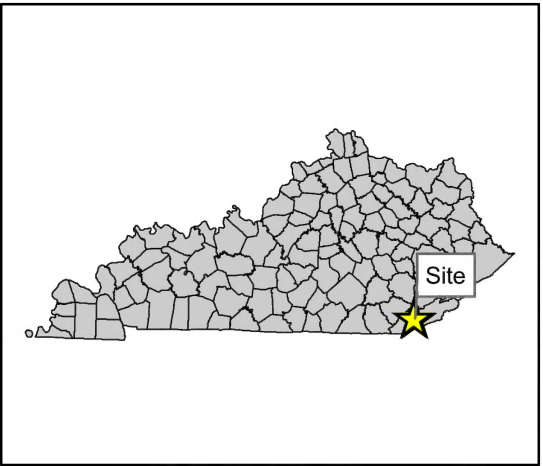
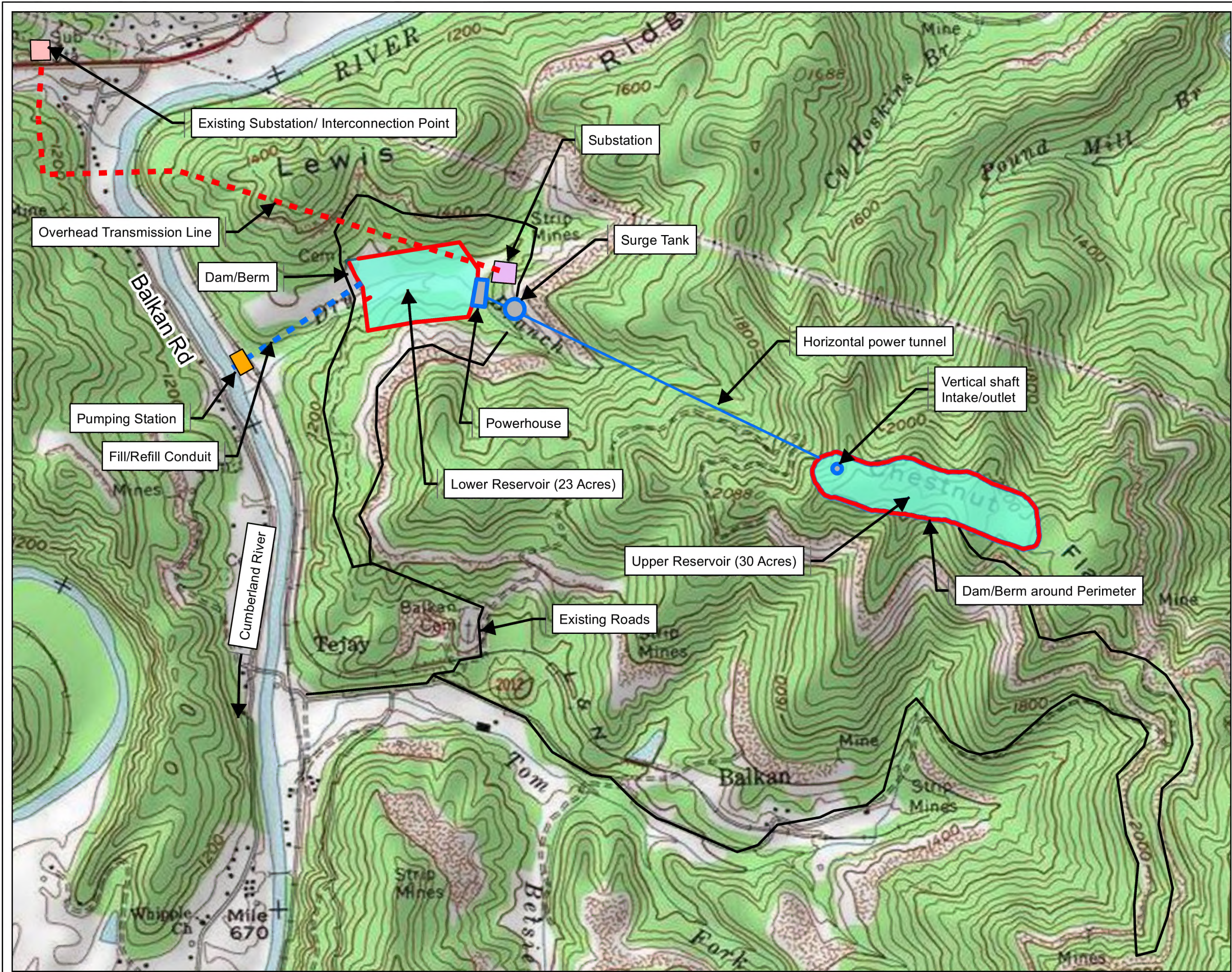
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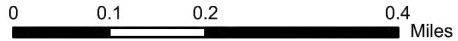
Rye Development

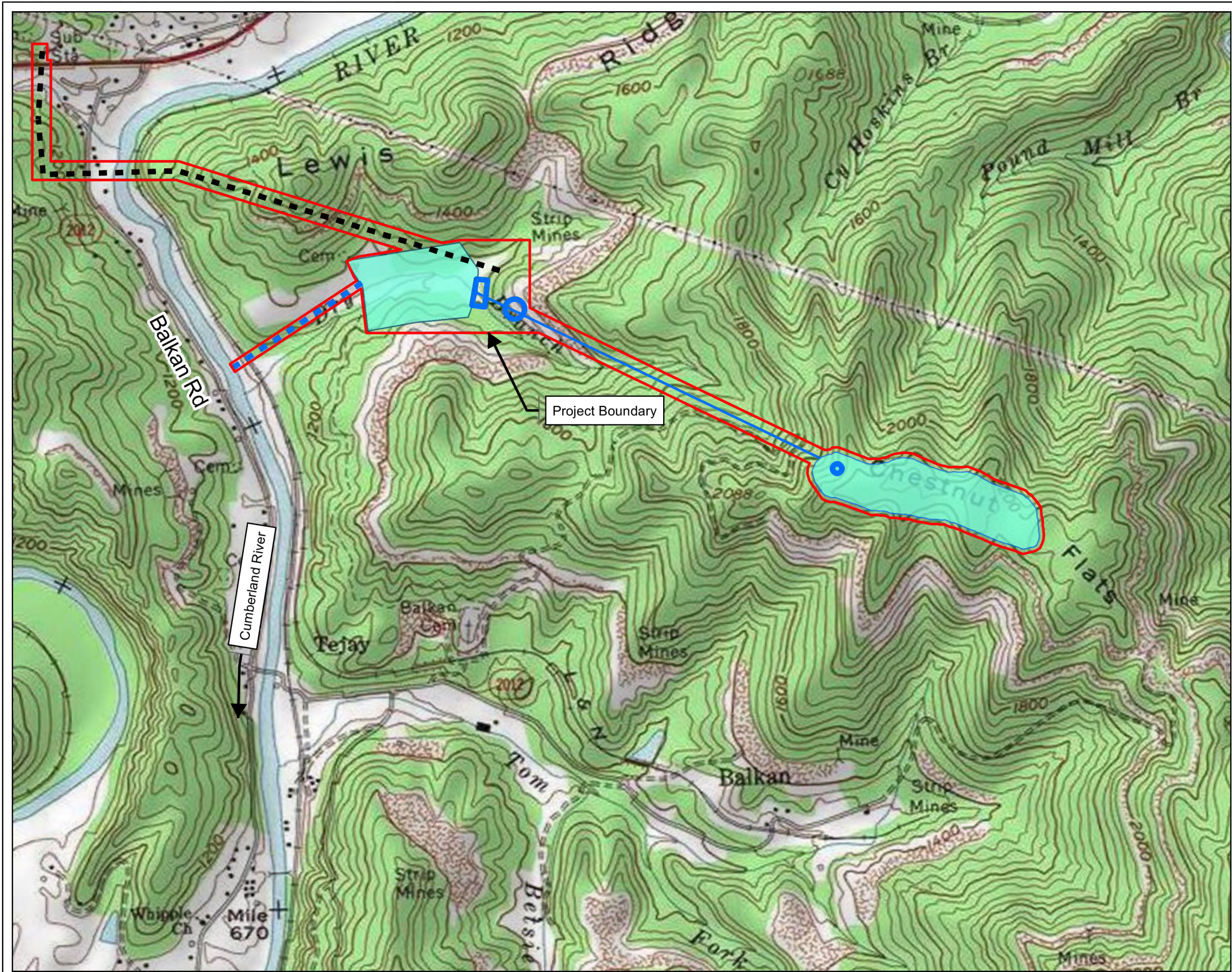
Figure 3.2-1:
Proposed Project Features Map

- Project Features**
- Structure**
- Fill/Refill Conduit
 - Penstock
 - Road
 - Transmission Line
 - Dam/Berm
 - Powerhouse
 - Project Substation
 - Interconnection Substation
 - Pumping Station

**Lewis Ridge
Pumped Storage
Project**

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Rye Development

Figure 3.3-1:
Proposed Project Boundary Map

Legend

- Project Boundary

Project Features

Structure

- Fill/Refill Conduit
- Penstock
- Transmission Line
- Powerhouse

Lewis Ridge
Pumped Storage
Project

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0 0.1 0.2 0.4 Miles



Document Content(s)

Lewis Ridge PPA Filed with FERC.pdf.....1